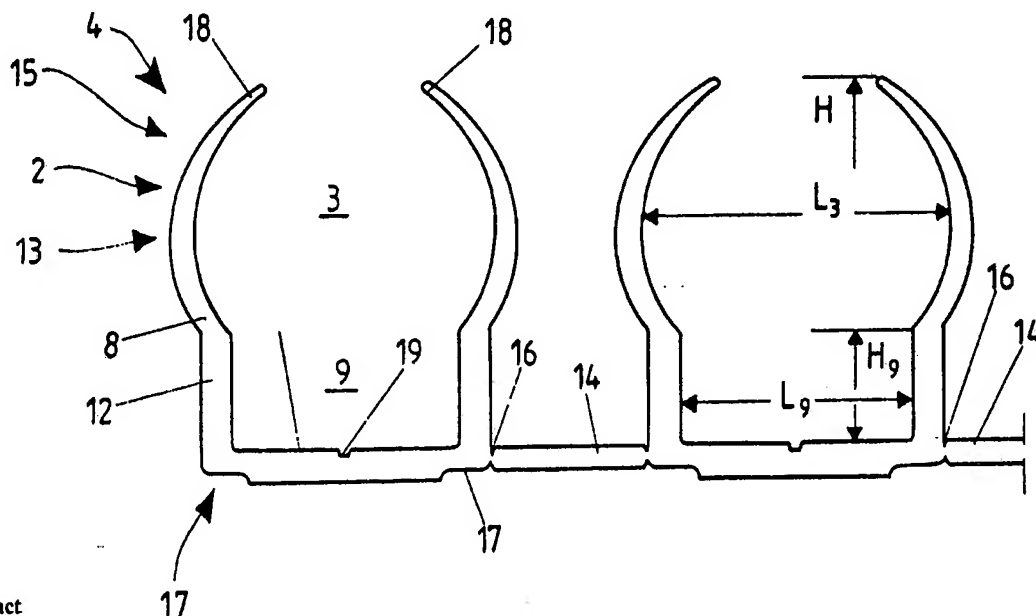




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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**(54) Title:** AN ATTACHMENT MOULDING FOR AN ELECTRICAL CABLE OR LIKE



**(57) Abstract**

The object of the invention is a longitudinal attachment moulding (4) for an electrical cable (6) or like, which includes a bottom section (1) attached to a base (10), slightly flexible sides (2) rising from the bottom section, which form between them a cable space (3) that is wider than the distance between their free edges, into which the cable (6) or other similar is pressed by temporarily spreading to the side the flexible free edges of the sides (2), separate formed parts (8) of the sides (2) or special tongues (5) for carrying the cable (6) between the sides at such a height that space remains beneath the cable for the head (7) of the attachment member, e.g. a screw, in which case the bottom section (1) is always visible from above.

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## AN ATTACHMENT MOULDING FOR AN ELECTRICAL CABLE OR LIKE

The object of the invention is a longitudinal attachment moulding for an electrical cable or other, which includes

- 5 - a bottom section to be attached to a base,
- slightly flexible sides rising from the bottom section, which form between them a cable space that is wider than the distance between their free edges, into which the cable or other similar is pressed by temporarily spreading
- 10 - ing to the side the flexible free edges of the sides,
- members for carrying the cable between the sides at such a height that space remains beneath the cable for an attachment member, e.g. the head of a screw.

- 15 Finnish patent FI 31690 shows a single clip, which is manufactured by spray moulding in a suitable form. The split level of the form is located in the centre, seen from the direction of the cable, in which case only short pieces can be produced. A single clip is known from British patent GB 894867, in which a
- 20 hole for the head of a screw is made in a separate operation.

In addition to individual clips, unified long mouldings have been developed for the attachment of an electrical cable. The are attached to a base by screwing, mailing, or gluing. The

25 cable is placed in the moulding after the latter has been attached.

In one known solution the moulding includes a cover, which is pressed onto the moulding after the cable has been placed in

30 it. The cover grips a groove in the moulding. The moulding must then be so commodious that the head of an attachment screw too fits into the moulding without raising the cable above the space in the moulding. In a moulding of this kind the cable lies loosely and curves requirement curved pieces.

35 In another known solution, by the trade name of NOKIA XTL™, the attachment base for cables is formed by a moulding that it considerably wider than the cable, to which normally several cables are attached to grooves in the moulding by means of

40 gripping clips. After installation a moulding-shaped cover is

pressed onto the moulding, this being attached to a groove in a protrusion from the bottom moulding.

In yet another known moulding glue is spread on the bottom of the moulding that comes in contact with the base. The moulding, which is glued to a base, closes towards its open side and broadens towards the bottom, when the edges of the moulding press the cable against the bottom, holding it firmly in the moulding. In even a straightened metal cable, however, the bending tension tends in time to lift the moulding from the base. Screw attachment is not possible, because the head of the screw remains in the cable space, thus raising it in an ugly manner at such points.

A moulding equipped with a false bottom is known from German patent publication No 20,237,764, in which the false bottom supports the cable above the bottom in order to create a space for the head of a screw. The space is made so great that the head of the nail or screw remains entirely within it and the false bottom insulates the cable electrically from the attachment member. A moulding of this type demands, as an additional operation, the pre-drilling of holes in the cover for the attachment screws. Especially on a hard base, such as concrete, one difficulty in attachment is the location of the attachment plug at the same point as the hole in the cover. The hollow space is also said to be of significance in terms of manufacturing techniques.

Despite the few known attachment mouldings referred to above, in practice the permanent surface installation of electrical cables is usually carried out using individual clips, when the clips form protrusions to the side of or above the cable. Slightly exaggerating, the final result has been as in Figure 1.

The intention of this invention is to create a real alternative to the individual clip installation of cables, based on unified attachment mouldings. The intention of the invention is thus to create an attachment moulding for electrical cables and

similar, which when installed recalls in its form the cable to be attached, which straightens the cable, and which can be easily and reliably attached to a base. It is also wished, by means of the invention, to correct the defects of the above-mentioned attachment mouldings. The characteristic features of this invention are presented in the accompanying Patent Claims.

In moulding types in accordance with the invention the cable is raised by means of parts formed in the sides or by separate protrusions from the bottom level by at least as much that the head of the attachment member, a nail or screw, can fit completely beneath the cable in the space between the sides. In general an attachment moulding in accordance with the invention is attached by means of individual attachment members, by means of screws or nails. As the moulding and the cable placed in it are essentially stiffer than the cable by itself, essentially fewer attachment points are required than when attaching by means of individual clips. Thirdly, the bottom of the moulding is visible the whole time through the gap remaining between the sides. Should the attachment screw require a starter hole there is then no obstacle to using a spike pushed through the bottom part, advantageously guided by a centering groove, for example at the point of a plug placed in a hard wall, or at any other arbitrary point.

There are two main ways of forming an attachment moulding in accordance with the invention. In the case of larger mouldings, where the diameter of the cable to be attached is considerably greater than the head of the attachment screw or nail, the cable space can be formed as a broadening in the upper part of the sides. In the case of smaller mouldings, separate carrier tongues are required in the sides.

Both sides include the member referred to above, which are separate from each other, tongues or thickenings in form, forming supports opposite to the free edges that bend on top of the cable.

The manufacture of the moulding by extruding plastic requires that the material strength of the moulding profile is as even as possible. The bending of the sides required by different thicknesses of cable is arrived at by reductions made at  
5 suitable points.

Other forms of application and advantages of the invention are dealt with later.

- 10 The invention is described with the aid of examples of applications by referring to the accompanying illustrations, in which Figure 1 shows the manner of installing electrical cables most generally used and in accordance with the present state of the art
- 15 Figure 2 shows the installation of electrical cables in Figure 1 using attachment mouldings in accordance with the invention
- Figures 3 and 4 show cross-sections of a moulding in accordance with the first form of application, both separately and in use
- 20 Figures 5 and 6 show cross-sections of a moulding in accordance with a second form of application, after the manner of Figures 3 and 4
- Figures 7 and 8 show cross-sections of a moulding in accordance with a third form of application, after the manner of Figures 3 and 4
- 25 Figure 9 shows a perspective view of a moulding with cables as in Figures 4 and 11
- Figure 10 shows a cross-section of a multiple moulding formed from several parallel mouldings
- 30 Figure 11 shows a partial enlargement of the multiple moulding shown in Figure 10
- Figure 12 shows a variation of the multiple moulding using a profile as in Figure 5
- 35 Figure 13 shows a cross-section of yet another variation of the moulding as in Figure 5 for very fine cables
- Figure 14 shows a cross-section of yet another variation
- Figures 15 and 16 show an installation arrangement using mouldings in accordance with the invention

The permanent electrical installations of a building are generally carried out with 7 - 16 mm diameter electrical cables and telecommunications installations with 4 - 8 mm diameter  
5 cables. The attachment of cables shown in Figure 1, by means of individual clips, has so far been the most economical manner of attachment. Using individual clips, electrical cables must be attached at intervals of about 15 - 25 cm and telecommunication cables at intervals of about 7 - 15 cm.

10

Figure 2 shows the same installation using attachment mouldings in accordance with the invention. Here the electrical cables 6 run very straight in moulding 4, which is open on top. The colour of the moulding has been selected to be the same as the  
15 colour of the cable.

In Figures 3 - 8 and 10 - 14 longitudinal mouldings in accordance with the invention are presented with the aid of profile cross- sections. When interpreting these it must always be  
20 remembered that the attachment moulding is in reality a longitudinal piece as in Figures 2, 9, and 15 - 16. Its manufacturing length is most advantageously 2 - 3 m.

In the solutions shown in Figures 3, 7, and 11, the curved  
25 upper sections 13 the sides 2 of the attachment mouldings 4 delimit the cable space 3 between them. By means of the form of the sides 2 the cable is forced to within a certain distance of the bottom section 1, as in Figures 4, 8, and 9. Referring to Figures 3 and 4 the attachment moulding is thus formed by the  
30 bottom section 1 and the sides 2. In the form of application in Figures 3 and 4 the lower part of the sides 2 includes a vertical lower section 12 rising vertically from the bottom section 1 and a curved upper section 13 attached to this. The lower part of the curve, as formed part 8, forms a member  
35 carrying the cable, which prevents cable 6 from pressing against the head 7 of the attachment member 11. The curved parts 13 take up a position on both sides of the cable 6, holding this in a completely fixed position. Depending on the

flexibility of the side sections 2, the attachment moulding can be used for cables within a certain range of diameters.

It is quite essential that the free edges 18 of the sides 2 of the attachment moulding 4 are at a distance to each other in the same way as the shaped sections 8 of the sides, in which case the attachment device or spike can be placed against the bottom section 1 while installing the moulding.

10 In accordance with Figure 4 an attachment moulding of this kind is advantageously attached using a dome-headed screw, in which case the head 7 of the screw is advantageously the same width as the attachment space 9, thus pressing the bottom section against the base over as great a surface area as possible.

15 Figures 5 and 6 show another principle form of application of the attachment moulding in accordance with the invention, which differing in scale from Figures 3 - 8 is intended for finer cables than the previous ones. When attaching the pieces in this case it is preferred to use 3 - 4 mm diameter screws, independent of the size of the pieces. The width of the head of the screw is typically twice the external diameter of the thread. Thus when using these normal screws the head of a screw of a diameter of at least 6 mm does not permit the cable space to be narrowed to much less than 9 mm. The curved sides 2 squeeze the cable between them and against the false bottom formed by the tongues 5, as in Figure 10. At the screw the tongues 5 bend to the side, thus permitting the head of the screw to go under the cable space, Figure 6.

30 In the form of application in Figures 5 and 6, on the other hand, the head of the screw may be as wide as the cable space, when the cable space can be narrowed at least as much as the head of the screw or brad. Here too the basic components of the attachment moulding are the bottom section 1 and sides 2, but in addition to these the moulding includes carrier tongues 5 in both sides, when a space 3 for the cable and a space 9 for the head are formed within the attachment moulding 4. The side sections 2 rise vertically from the bottom section and curve



towards one another only at the upper edge. Here too the bottom section 1 is visible between the sides 2 and their connected tongues 5 for placing a screw or spike or brad in order to insert them through the bottom section.

5

Figures 10 and 11 show an improved variation of the attachment moulding of Figures 3 and 4. In addition to the changes made in attachment moulding 4 itself, in this several attachment mouldings are connected by their bottom section by means of special connecting strips 14. This includes at least one breaking groove, or as in shown in Figure 11 breaking grooves 16 are shown at both ends. By means of this individual attachment mouldings 4 can be removed from this five attachment moulding unit 15. A unit 15 of this kind can still be advantageously manufactured by extrusion if the length is 2 - 3 m. A unit of this kind can be used to advantage when installing two or more cables parallel to one another, in which case the number of attachments can be further reduced. On the other hand, during transportation individual attachment mouldings suffer less damage when forming part of a unit of this kind than when separate.

Figure 11 shows in addition improvements made to an individual moulding when compared to Figures 3 and 4. The bottom section 1 advantageously includes a guide groove 19, by means of which it is easy to centre screws, brads, and tools. The edges of the bottom section 1 include broad thin section 17, which provide the side sections 2 with flexibility, even after the attachment of the attachment moulding 4. The profile of the attachment moulding 4 here is of even thickness except for the edges 18 of the sides. By means of the thinned edges 18 the cable space 3 provides a suitable form for cables of differing diameter. Even though the cable presses to some extent into the rectangular space 9, which remains between the straight side sections 12, most of this remains available to the heads of the attachment members.

In this the width ( $L_9$ ) of the space 9 reserved for the head of the attachment member is most advantageously 50 - 85% of the

greatest width ( $L_3$ ) of the cable space 3. The height ( $H_9$ ) of the aforementioned rectangular space 9 is advantageously 20 - 35% of the total internal height ( $H$ ) of the moulding 4.

5 Figure 12 shows an improved version of an attachment moulding 4 in accordance with Figures 5 and 6, in this case also as a parallel row version. Here the tongues forming part of the sides 2 are relatively slightly higher than those of the attachment moulding in Figure 5. Attachment takes place most  
10 advantageously using a countersunk-head screw 21, the lower conical surface of which is guided by the thinned edges 18 of the sides 2 without damaging them. The final position of the screw is shown by a broken line, when it can be seen that the head takes up a position entirely beneath the tongues 5. Here  
15 too the side of the bottom section 1 has a thinning 17, the bottom section 1 and the sides 2 being otherwise of nearly equal thickness.

Here the width ( $L_1$ ) of the bottom section 1 is about 6 mm. The  
20 gap ( $L_5$ ) between the tongues 5 is advantageously 30 - 60% of the internal width ( $L_1$ ) of the bottom section. The internal height of the space delimited by the tongues 5 is advantageously 40 - 70% of the internal height ( $H$ ) of the entire moulding. The gap ( $L_{18}$ ) between the edges 8 of the sides is advantageously  
25 ly 40 - 70 % of the internal width of the bottom section.

When attaching even finer cables an even smaller attachment moulding 4 than the above is required, as in Figure 13. Here the attachment of the moulding 4 takes place most advantageously  
30 ly using brads, in which case a tool with a typical diameter of 4 mm demands a minimum internal width of the bottom section 1 of about 4 mm, but more advantageously of 5 mm. The nailing tool (e.g. Spear & Jackson's 'Braddriver 9180') breaks the tongues 5 at the brad, but the break is small and is hidden  
35 beneath the cable.

A thinning that increases the flexibility of the sides 2 has had to be moved to the lower part of the sides 2. Thinning 22 forms a flexing point in the sides, which permits the sides to

bend to the width of the electrical cable. The sides 2 do not really bend at any other point than the thinning point and the thinned edges. Here the head 7 of the brad used as an attachment member 11 remains entirely in the space 9 reserved for the head.

The previous attachment mouldings' sides include curved parts, which may, however, be quite as well realized as shown in Figure 14. This shows a variation of the attachment mouldings in Figures 3, 4, and 11. Here too the attachment moulding includes a bottom section 1 and sides 2, in which, however, the upper part 13' of the sides is realized with the aid of several angles and not as a continual curve. The bending of the sides is also carried out in a manner differing slightly from the previous one, that is by means of thinning 22.

The installation of attachment mouldings takes place in accordance with Figures 15 and 16. The attachment mouldings 14 are attached at long intervals, for example in the case of a gypsum board wall only at the supporting studs, i.e. at about 60 cm centres. The attachment moulding 4 is attached using a suitable attachment member 11. Either a 3 - 3,5 mm dome-headed screw or a brad is used. The groove in the bottom of the moulding guides the point of the screw or brad to the centre of the moulding. When connecting the cable to a device or junction box the cable is brought from the end of the moulding and not from its opening, in which case a suitable gap is left between the device and the moulding. In the same way at a curve the moulding is cut and the gap required by the curve is left between the ends, Figure 15. The cable 6 is simply pushed into the attached moulding 4 once this has been attached to the base.

The material of the moulding is, for example, PVC plastic, polyamide, polypropylene, or polythene.

Naturally also many kind of pipes can be attached by the mouldings presented herewith.

## PATENT CLAIMS

1. A longitudinal attachment moulding (4) for an electrical cable (6) or like, which includes
- 5 - a bottom section (1) attached to a base (10),  
- slightly flexible sides (2) rising from the bottom section, which form between them a cable space (3) that is wider than the distance between their free edges, into which the cable (6) or other similar is pressed by temporarily spreading to the side the flexible free edges of the sides (2),
- 10 - members (5, 8) for carrying the cable (6) between the sides at such a height that space remains beneath the cable for the head (7) of the attachment member, e.g. a screw,
- 15 characterized in that the members (5, 8) for carrying the cable (6) are located separately on the sides (2) as supports forming part of them in such a way that there remains between them a space for placing the attachment member (7) against the bottom with no obstacle and that these members (5, 8) form opposing supports for securing the cable (6) to the free edges (18) of the sides (2).
2. An attachment moulding (4) in accordance with Patent Claim 1, characterized in that the cable space (3) formed by the sides (2) widens around the cable (6) only at a distance upwards from the bottom section (1), being at its widest at about the middle of the cable space (3).
- 25 3. An attachment moulding (4) in accordance with Patent Claim 2 characterized in that the width of the space (9) reserved for the head (7) of the attachment member (11) is 50 - 85% of the greatest width of the cable space (3).
- 30 4. An attachment moulding (4) in accordance with Patent Claims 2 or 3, characterized in that the lower parts (12) of the sides (2) delimit between them an essentially rectangular free space (9) for the head (7) of the attachment member and that above them there are outwardly protruding curved parts (13).

5. An attachment moulding in accordance with Patent Claim 4, characterized in that the height of the aforesaid rectangular space is 20 - 35% of the entire internal height of the moulding (4).
- 5 6. An attachment moulding (4) in accordance with Patent Claim 1, characterized in that the aforesaid cable-supporting members are formed by tongues (5) protruding to the centre from the sides, between which there remains the aforesaid gap for the  
10 installation of an attachment member (11).
7. An attachment moulding (4) in accordance with Patent Claim 6, characterized in that the sides (2) extend from the bottom section first all vertically upwards and only curve towards one  
15 another above the tongues (5), in such a way that the gap between the free edges is reduced to 40 - 70% of the internal width of the bottom section (1).
8. An attachment moulding (4) in accordance with Patent Claim  
20 6 or 7, characterized in that the tongues (5) delimit within themselves a space (9), the height of which is 20 - 35% of the internal height of the entire moulding (4).
9. An attachment moulding (4) in accordance with Patent Claims  
25 6 - 8, characterized in that the gap between the tongues (5) is 30 - 60% of the internal width of the bottom section (1).
10. An attachment moulding (4) in accordance with Patent Claims  
1 - 9, characterized in that the centre of the bottom section  
30 (1) of the moulding (4) includes a longitudinal groove (19) to guide an attachment member or tool to the centre of the moulding.
11. An attachment moulding (4) in accordance with Patent Claims  
35 1 - 10, characterized in that there is a thinning (17, 22) close to the junction between the bottom section (1) and the sides (2) in order to make it possible to bend the sides.

12. An attachment moulding (4) in accordance with Patent Claim 11, characterized in that the aforesaid thinnings (17) are formed as a broad band beneath the bottom section (1) beginning from the region of the internal wall of the sides (2) and  
5 extending to the edges.

13. An attachment moulding (4) in accordance with Patent Claims 1 - 12, characterized in that it includes several, for example five, parallel attachment mouldings forming a single unit  
10 (15), in which the adjacent mouldings (4) are connected to one another by means of intermediate strips (14), to which there is attached at least one detachment thinning to permit the detachment of one or more mouldings (4) from the unit (15).

15 14. An attachment moulding (4) in accordance with Patent Claims 1 - 13, characterized in that in the profile of the moulding (4) the sides (2) thin towards their free edges (18) in the area above the cable space (3).

20 15. An attachment moulding (4) in accordance with Patent Claims 1 - 13, characterized in that the bottom section (1) and the sides (2) at least in the vicinity of the bottom section (1) are of equal thickness, except for thinnings that make bending possible.

25 16. An attachment moulding (4) in accordance with Patent Claim 6, to be attached especially with brads, characterized in that the internal width of the bottom section (1) is at the most 5,0 mm and that the lower edge of the sides (2) include thinnings  
30 (22) that make bending possible.

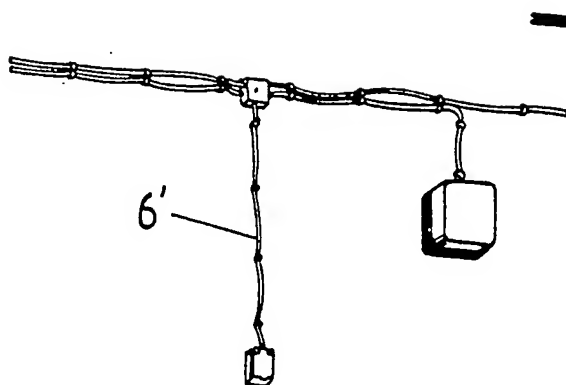


FIG. 1

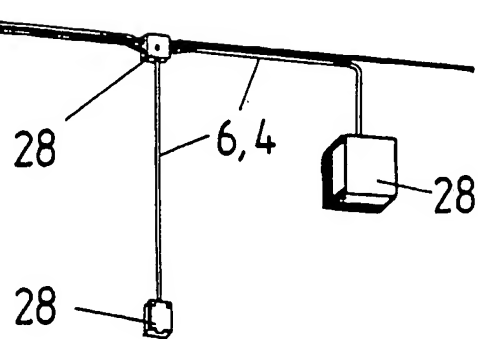


FIG. 2

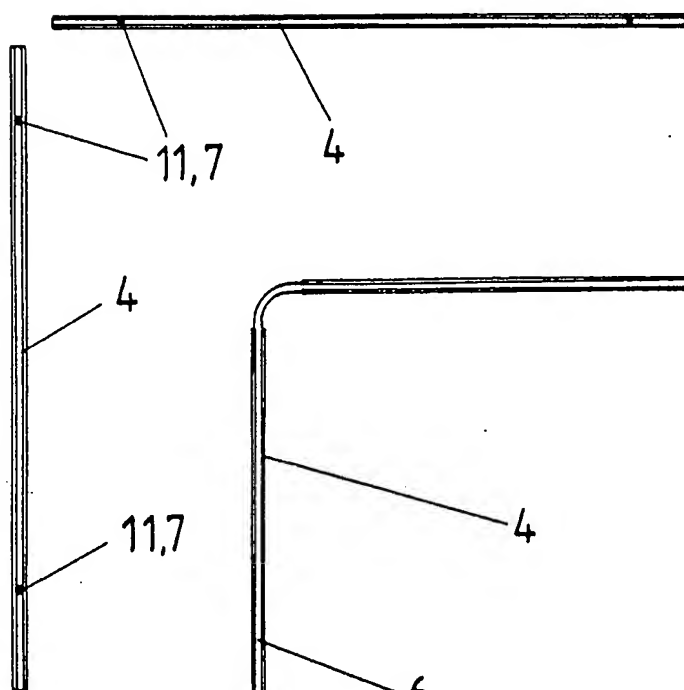


FIG. 15

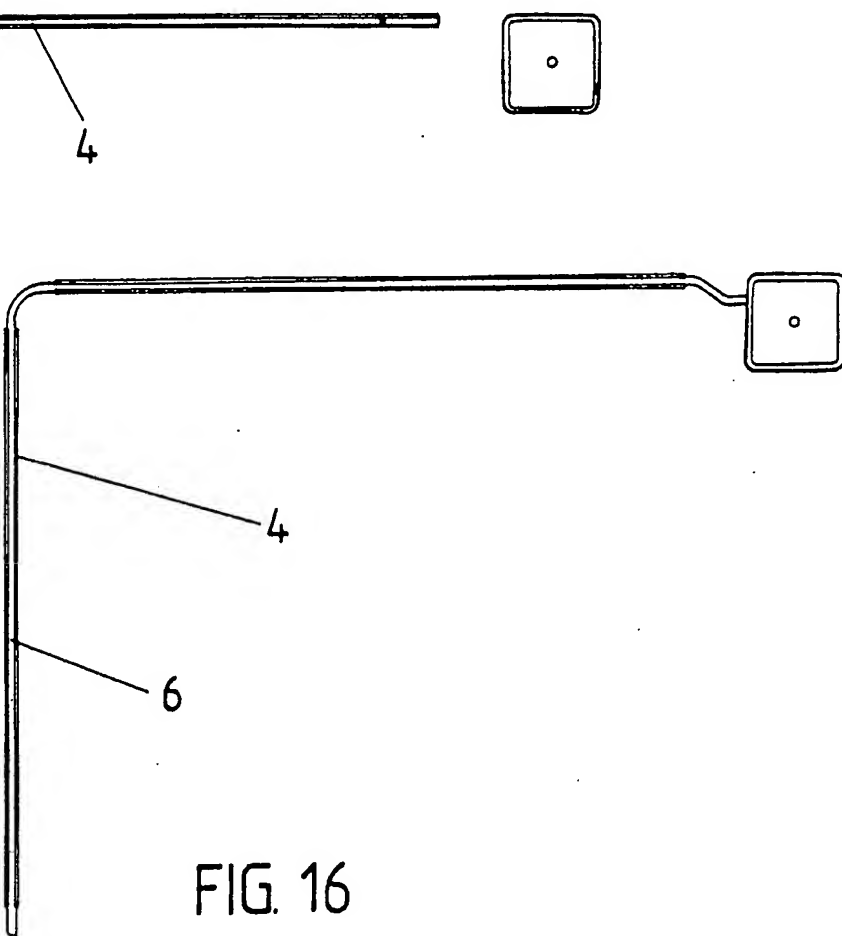
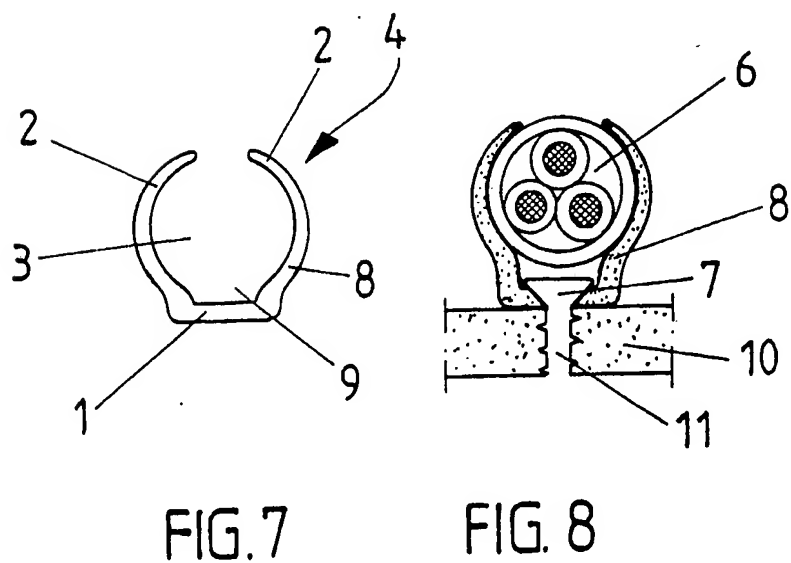
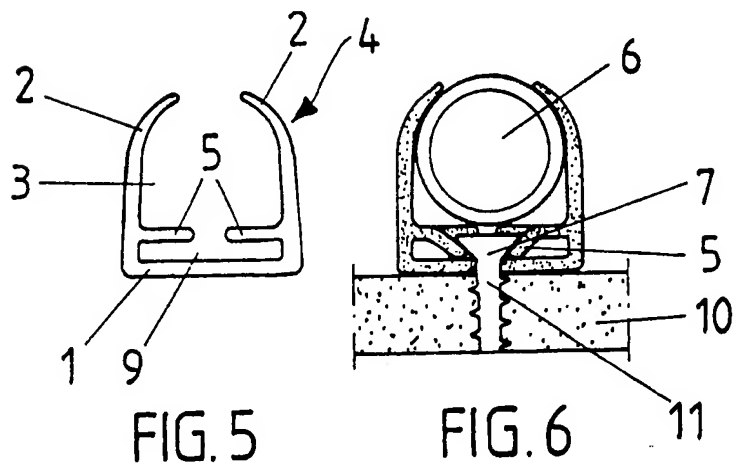
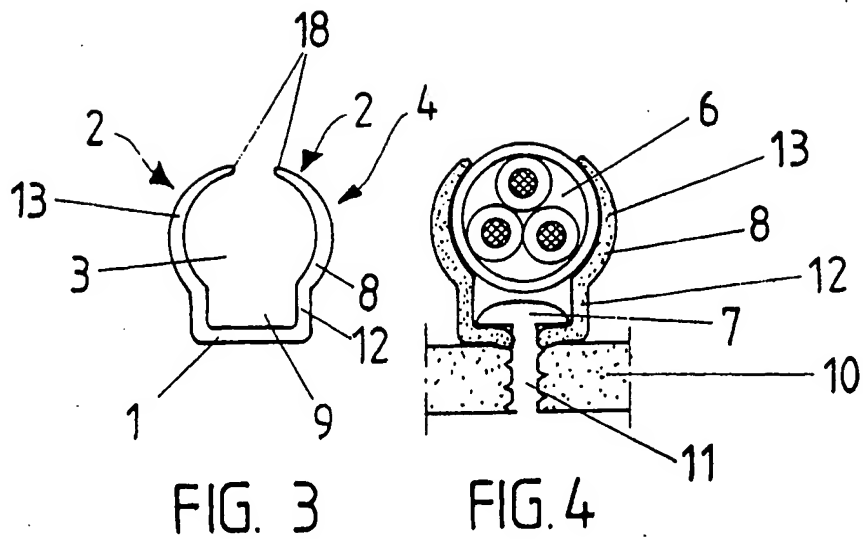


FIG. 16





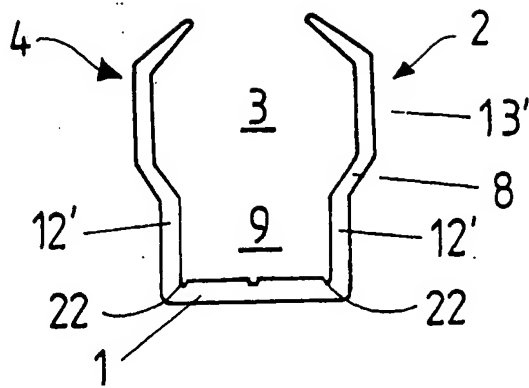


FIG. 14

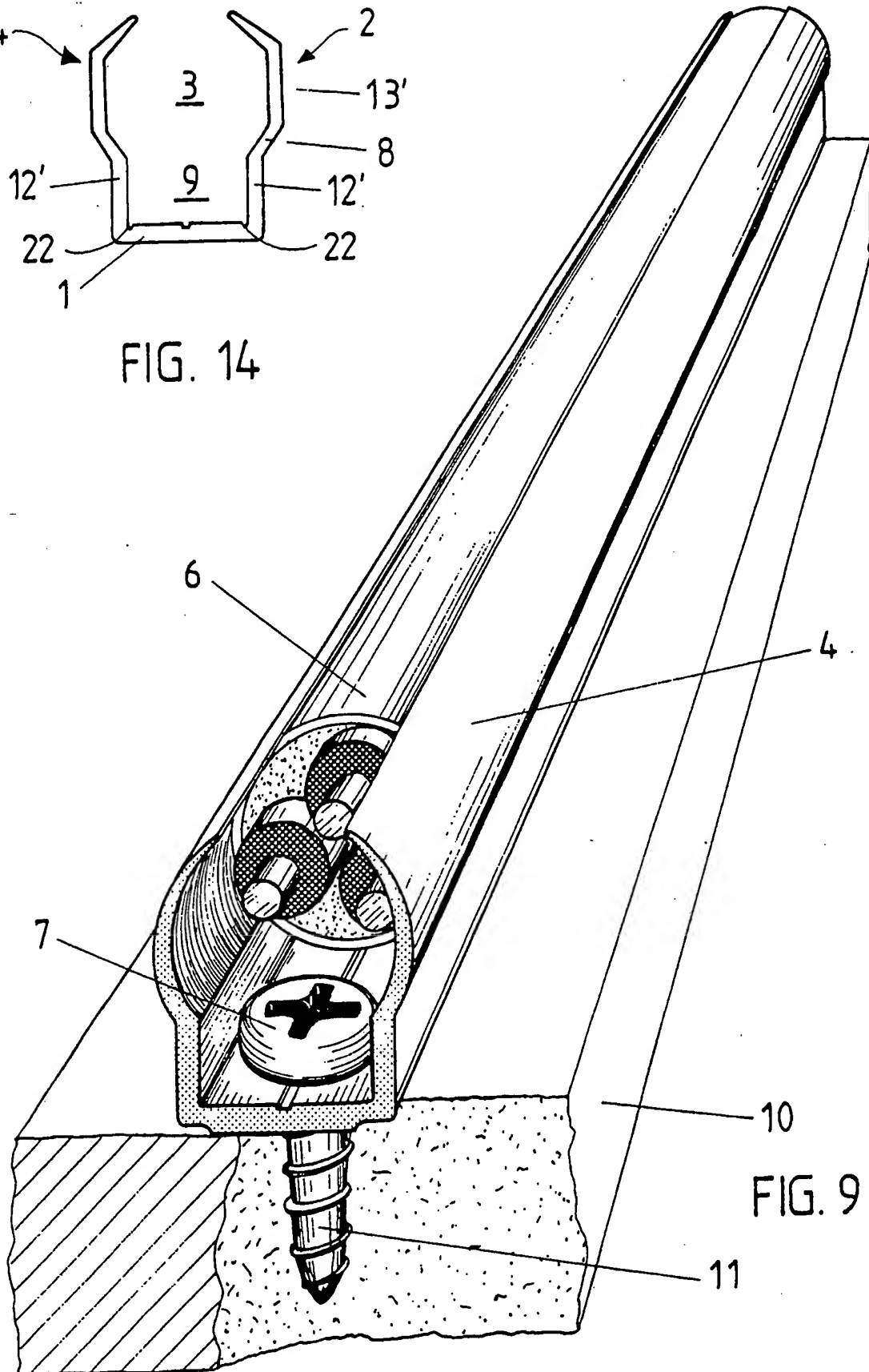
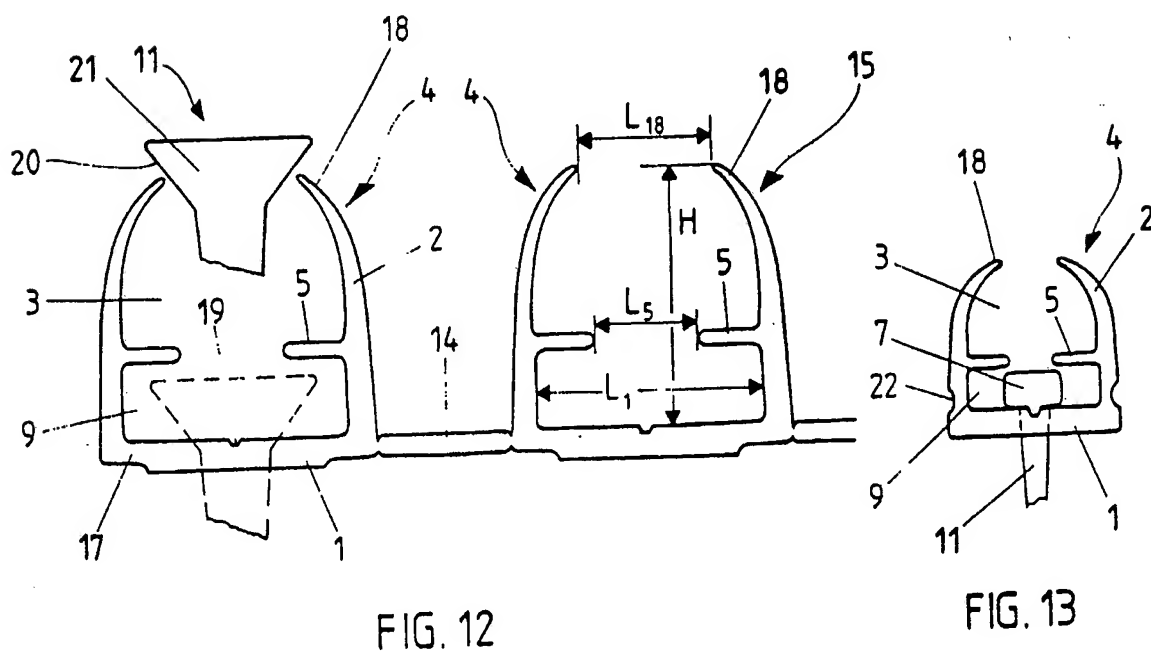
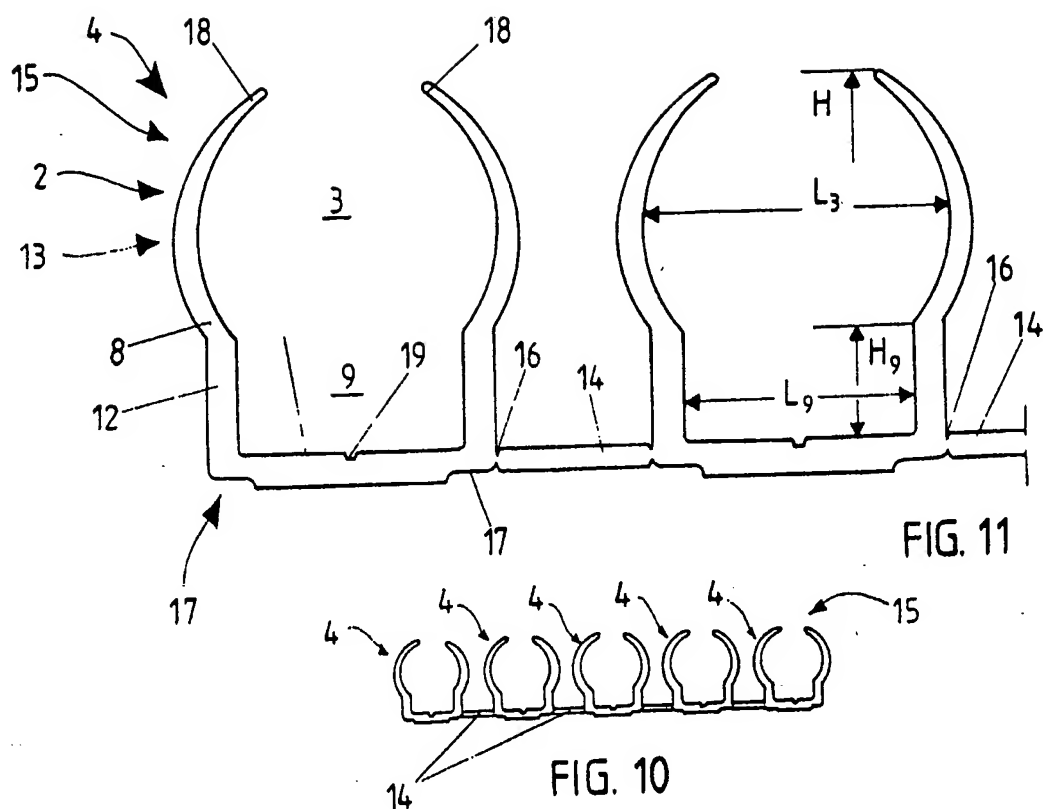


FIG. 9



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 93/00018

## A. CLASSIFICATION OF SUBJECT MATTER

IPC5: H02G 3/04

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: H02G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP, A1, 0349376 (LEGRAND), 3 January 1990 (03.01.90) --	1-9,11-16
X	DE, A, 1947782 (FA. REICHLE + DE-MASSARI), 30 April 1970 (30.04.70) -- -----	1-5,10-15

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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Date of the actual completion of the international search

6 April 1993

Date of mailing of the international search report

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**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

26/02/93

International application No.

PCT/FI 93/00018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A1- 0349376	03/01/90	SE-T3- 0349376 AU-B- 611039 AU-A- 3714389 DE-U- 6890141 FR-A,B- 2633461	30/05/91 04/01/90 11/06/92 29/12/89
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